SECTION 8. That Article VIII, "Energy Conservation Code", is hereby repealed and re-enacted with amendments as follows:

ARTICLE VIII. ENERGY CONSERVATION CODE

DIVISION 1. GENERALLY

Sec. 5-156. Scope.

This article regulates the design and construction of the thermal envelopes and selection of HVAC, service water heating, electrical distribution systems and equipment required for the purpose of effective use of energy and shall govern all buildings and structures, or portions thereof, hereafter erected that provide facilities or shelter for human occupancy.

Secs. 5-157 – 5-160. Reserved.

DIVISION 2. TECHNICAL STANDARDS

Sec. 5-161. International Energy Conservation Code--Adopted.

The International Code Council (ICC) International Energy Conservation Code, 2012 Edition, as modified herein, is hereby adopted as the energy conservation code for the City. One (1) copy of such publication as adopted shall be housed by the Inspection Services Division and made available for inspection by the public during regular office hours. Any amendment or change in such code promulgated by the International Code Council shall not become part of this article until the modifications have been duly adopted by ordinance. References to other ordinances and codes of the City shall be interpreted and applied in accordance with the terms and effect of such ordinances and codes at the time of such application and interpretation.

Sec. 5-162. Same--Amendments.

The ICC International Energy Conservation Code, 2012 Edition (IECC), is amended in the following respects:

Section C101.1 of the IECC is amended to read as follows:

> **C101.1 Title.** This code shall be known as the *International Energy Conservation Code of the City of Rockville*, and shall be cited as such. It is referred to herein as "this code".

Section C102.1.1 of the IECC is amended to read as follows:

C102.1.1 Above code programs. The code official or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code if the program provides a detailed written energy analysis study demonstrating that the requirements in the program exceed all requirements of this code and includes a requirement for inspections of each building by an accredited independent party to determine compliance. Buildings approved in writing by such an energy efficiency program and that meet all mandatory provisions of this Article shall be considered in compliance with this code.

Section C107.1 of the IECC is amended as follows:

C107.1 Fees: The fees shall be as established by resolution of the Mayor and Council.

Sections C107.2, C107.3, C107.4 and C107.5 of the IECC are deleted.

Section C109 of the IECC is deleted in its entirety, and replaced with the following:

C109.1 Administrative Appeals. Any person aggrieved by and desirous of challenging a decision of the administrative authority in connection with the interpretation, application, or modification of any provision of this chapter relating to the manner of construction or materials used in connection with the erection, alteration, or repair of a building or structure or system installed therein, shall appeal such decision to a Board of Adjustments and Appeals. An appeal may be taken when it is claimed that:

(1) The true intent of the code or the rules legally adopted there under have been incorrectly interpreted; or

(2) The provisions of the code do not fully apply; or

(3) An equally good or better form of construction can be used.

C109.2 Application for appeal. An appeal shall be filed with the City Clerk within seven (7) calendar days from the date of the administrative decision being appealed, and a copy thereof shall be submitted to the Chief of Inspection Services Division. The appeal shall be in writing and shall contain a detailed statement of the reasons in support of such appeal.

C109.3 Membership.

C109.3.1. Number. The Board of Adjustments and Appeals shall consist of three (3) persons:

a) A licensed professional engineer or architect chosen by the administrative authority;

b) A licensed professional engineer or architect chosen by the owner of the subject building or structure; and

c) A licensed professional engineer or architect to be jointly chosen by the other two (2) members.

C109.3.2 Compensation. All fees charged by the licensed professional engineers or architects to serve on the Board shall be paid for by the person appealing the administrative decision.

C109.4 Meetings and Hearings. The Board of Adjustments and Appeals shall conduct a hearing on the appeal, at which time the appellant, the appellant's representative, representatives of the City who have inspected the subject building or structure or applicable system installed therein, and any other person having knowledge of the matter or whose interests may be affected by the decision on the appeal shall be given an opportunity to be heard. The hearing shall be conducted informally, and the formal rules of evidence shall not apply. The Board may accept written testimony and shall give it such weight as it deserves.

C109.4.1 Interpretation. Interpretation given provisions of the applicable ICC or NFPA Code by the International Code Council or National Fire Protection Association shall be given great deference.

C109.4.2 Actions. The Board may inspect the structure or building and conduct any other investigation or research necessary in order to render a decision.

C109.5 Decision. The following process shall be followed:

(1) Within fifteen (15) working days of the hearing, the Board shall affirm, modify or reverse the decision of the administrative authority.

(2) The agreement of any two (2) members of the Board shall constitute the decision of the Board. Failure to obtain the agreement of any two (2) members of the Board shall constitute a denial of the appeal and an affirmation of the decision of the administrative authority. The Board's findings and decision shall be rendered in writing and copies thereof shall be provided to the appellant and any other party who has entered their appearance before the Board and requested a copy of the decision. The decision may contain recommendations for remedial steps to be taken to meet the intent of the applicable code.

C109.6 Appeal. Any person aggrieved by a decision of the Board of Adjustments and Appeals may appeal the decision to the Circuit Court for the County in accordance with the Maryland Rules as set forth in Title 7, Chapter 200.

Section C301.1 of the IECC is amended to read as follows:

C301.1 General. Climate zone 4 shall be used for the City of Rockville in determining the applicable requirements.

Sections C301.2 and C301.3 of the IECC are deleted.

Section C402.1 of the IECC is amended to read as follows:

C402.1 General. (Prescriptive) The building thermal envelope shall comply with Section C402.1.1. Section C402.1.2 shall be permitted as an alternative to the R-values specified in Section C402.1.1. Climate zone "4 Except Marine" shall be used when referring to the tables to determine the applicable requirements.

Section R101.1 of the IECC is amended to read as follows:

R101.1 Title. This code shall be known as the *International Energy Conservation Code of the City of Rockville*, and shall be cited as such. It is referred to herein as "this code".

Section R102.1.1 of the IECC is amended to read as follows:

R102.1.1 Above code programs. The code official or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code if the program provides a detailed written energy analysis study demonstrating that the requirements in the program exceed all requirements of this code and includes a requirement for inspections of each building by an accredited independent party to determine compliance. Buildings approved in writing by such an energy efficiency program and that meet all mandatory provisions of this Article shall be considered in compliance with this code.

Section R107.1 of the IECC is amended as follows:

R107.1 Fees: The fees shall be as established by resolution of the Mayor and Council.

Sections R107.2, R107.3, R107.4 and R107.5 of the IECC are deleted.

Section R109 of the IECC is deleted in its entirety, and replaced with the following:

R109.1 Administrative Appeals. Any person aggrieved by and desirous of challenging a decision of the administrative authority in connection with the interpretation, application, or modification of any provision of this chapter relating to the manner of construction or materials used in connection with the erection, alteration, or repair of a building or structure or system installed therein, shall appeal such decision to a Board of Adjustments and Appeals. An appeal may be taken when it is claimed that:

(1) The true intent of the code or the rules legally adopted there under have been incorrectly interpreted; or

(2) The provisions of the code do not fully apply; or

(3) An equally good or better form of construction can be used.

R109.2 Application for appeal. An appeal shall be filed with the City Clerk within seven (7) calendar days from the date of the administrative decision being appealed, and a copy thereof shall be submitted to the Chief of Inspection Services Division. The appeal shall be in writing and shall contain a detailed statement of the reasons in support of such appeal.

R109.3 Membership.

R109.3.1. Number. The Board of Adjustments and Appeals shall consist of three (3) persons:

d) A licensed professional engineer or architect chosen by the administrative authority;

e) A licensed professional engineer or architect chosen by the owner of the subject building or structure; and

f) A licensed professional engineer or architect to be jointly chosen by the other two (2) members.

R109.3.2 Compensation. All fees charged by the licensed professional engineers or architects to serve on the Board shall be paid for by the person appealing the administrative decision.

R109.4 Meetings and Hearings. The Board of Adjustments and Appeals shall conduct a hearing on the appeal, at which time the appellant, the appellant's representative, representatives of the City who have inspected the subject building or structure or applicable system installed therein, and any other person having knowledge of the matter or whose interests may be affected by the decision on the appeal shall be given an opportunity to be heard. The hearing shall be conducted informally, and the formal rules of evidence shall not apply. The Board may accept written testimony and shall give it such weight as it deserves.

R109.4.1 Interpretation. Interpretation given provisions of the applicable ICC or NFPA Code by the International Code Council or National Fire Protection Association shall be given great deference.

R109.4.2 Actions. The Board may inspect the structure or building and conduct any other investigation or research necessary in order to render a decision.

R109.5 Decision. The following process shall be followed:

(1) Within fifteen (15) working days of the hearing, the Board shall affirm, modify or reverse the decision of the administrative authority.

(2) The agreement of any two (2) members of the Board shall constitute the decision of the Board. Failure to obtain the agreement of any two (2) members of the Board shall constitute a denial of the appeal and an affirmation of the decision of the administrative authority. The Board's findings and decision shall be rendered in writing and copies thereof shall be provided to the appellant and any other party who has entered their appearance before the Board and requested a copy of the decision. The decision may contain recommendations for remedial steps to be taken to meet the intent of the applicable code.

R109.6 Appeal. Any person aggrieved by a decision of the Board of Adjustments and Appeals may appeal the decision to the Circuit Court for the County in accordance with the Maryland Rules as set forth in Title 7, Chapter 200.

Section R301.1 of the IECC is amended to read as follows:

R301.1 General. Climate zone 4 shall be used for the City of Rockville in determining the applicable requirements.

Sections R301.2 and R301.3 of the IECC are deleted.

Table R402.1.1 of the IECC is amended to read as follows:

TABLE R402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT [a]

CLIMATE ZONE	FENES-TRATION U-FACTOR	SKY-LIGHT U-FACTOR [b]	GLAZED FENEST-RATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE [f]	FLOOR R-VALUE	BASEMENT [d] WALL R-VALUE	SLAB [d] R-VALUE & DEPTH	CRAWL SPACE [c] WALL R-VALUE
4	0.35	0.55	0.40	49	20 or 13+5[e]	8/13	19	10 / 13	10, 2ft	10 / 13

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHG Care maximums. When insulation is installed in a cavity which is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.
b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
c. "10/13" means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. "10/13" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall.

d. R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
e. First value is cavity insulation, second is continuous insulation or insulated siding, so "13+5 means r-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent of less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used – to maintain a consistent total sheathing thickness.
f. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

Table R402.1.3 of the IECC is amended to read as follows:

TABLE R402.1.3
EQUIVALENT U-FACTORS [a]

CLIMATE ZONE	FENES-TRATION U-FACTOR	SKY-LIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR[b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
4	0.35	0.55	0. 026	0. 057	0.098	0.047	0.059	0.065

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
b. When more than half the insulation is on the interior, the mass wall U-factor shall be a maximum of 0.087 in climate zone 4.

Section R402.1.5 of the IECC is added to read as follows:

R402.1.5 Envelope component descriptions and default values. When calculating the U-factor of an assembly as part of Section R402.1.3, R402.1.4, or R404.5.2, the values in Tables R402.1.5.1 through R402.1.5.3 shall be used unless alternate values are approved by the code official. In addition, the U-factor of the assembly shall be calculated using a series-parallel calculation with the default framing fractions in Tables R402.1.5.1 through R402.1.5.3. Subject to approval by the code official, the frame fractions for the proposed design shall be permitted to be determined by the type of construction (Satisfactory, Intermediate or Advanced) as defined in Sections R402.1.5.1 through R402.1.5.3.

R402.1.5.1 Wood stud frame walls. The type of construction (Satisfactory, Intermediate or Advanced) for determination of default framing fractions in wood stud frame walls are defined as follows:

Satisfactory Insulation and Framing Fractions:

Satisfactory wood stud frame walls include studs framed on 16-inch centers with double top plate and single bottom plate. Corners use three studs and each opening is framed using two studs.

Studs and plates: 21%

Insulated cavity: 75%

Headers: 4%

Intermediate Insulation and Framing Fractions:

Intermediate wood stud frame walls include studs framed on 16-inch centers with double top plate and single bottom plate. Corners use two studs or other means of fully insulating corners, and each opening is framed by two studs.

Studs and plates: 18%

Insulated cavity: 78%

Headers: 4%

Advanced Insulation and Framing Fractions:

Advanced wood stud frame walls include studs framed on 24-inch centers with double top plate and single bottom plate. Corners use two studs or other means of fully insulating corners, and one stud is used to support each header.

Studs and plates: 13%

Insulated cavity: 83%

Headers: 4%

TABLE R402.1.5.1
FRAME WALL COMPONENT DEFAULT VALUES

Component	Default Value	
Interior Air Film R-Value	0.68	
Drywall Layer R-Value	0.45	
Cavity Layer R-Values	Insulation: As Specified	Framing: R-1.25 per inch of wood
Standard Reference Design Insulation / Framing Fraction	Insulation: 83 %	Framing: 17 %
Proposed Design Default Insulation / Framing Fraction	Insulation: 78%	Framing: 22%
Insulating Sheathing Layer R-Value	0 or as installed	
Structural Sheathing Layer R-Value	0.62	
Siding Layer R-Value	0.61	
Exterior Air Film R-Value	0.25	

R402.1.5.2 Wood frame floors. The type of construction (Satisfactory, Intermediate or Advanced) for determination of default framing fractions in wood frame floors are defined as follows:

Satisfactory Insulation and Framing Fractions: Satisfactory wood floors include open joist systems framed 12-inch centers or solid joists framed 16-inch centers.

Framing: 12%

Insulated cavity: 88%

Intermediate Insulation and Framing Fractions: Intermediate wood floors include open joist systems framed 16-inch centers or solid joists framed 20-inch centers.

Framing: 10%

Insulated cavity: 90%

Advanced Insulation and Framing Fractions: Advanced wood floors include open joist systems framed 20-inch centers or joists framed 24-inch centers.

Framing: 8%

Insulated cavity: 92%

TABLE R402.1.5.2
FLOOR COMPONENT DEFAULT VALUES

Component	Default Value	
Interior Air Film R-Value	0.92	
Floor Covering R-Value	1.23	
Floor Subfloor R-Value	0.94	
Cavity Layer R-Values	Insulation: As Specified	Framing: R-1.25 per inch of wood
Standard Reference Design Insulation / Framing Fraction	Insulation: 92%	Framing: 8%
Proposed Design Default Insulation / Framing Fraction	Insulation: 90%	Framing: 10%
Exterior Air Film R-Value	0.92	

R402.1.5.3 Wood frame ceilings. The type of construction (Satisfactory, Intermediate or Advanced) for determination of default framing fractions in wood frame ceilings are defined as follows:

Satisfactory Insulation and Framing Fractions:

Satisfactory ceiling insulation and framing assumes tapering of insulation depth around the perimeter with resultant decrease in thermal resistance. An

increased R-value is assumed in the center of the ceiling due to the effect of piling leftover insulation.

Framing: 11%

Insulated cavity: 89%

Intermediate Insulation and Framing Fractions:

Intermediate ceiling insulation and framing assumes tapering of insulation depth around the perimeter with resultant decrease in thermal resistance. An increased R-value is assumed in the center of the ceiling due to the effect of piling leftover insulation.

Framing: 9%

Insulated cavity: 91%

Advanced Insulation and Framing Fractions:

Advanced ceiling insulation and framing assumes full and even depth of insulation extending to the outside edge of exterior perimeter of the ceiling.

Framing: 7%

Insulated cavity: 93%

TABLE R402.1.5.3
CEILING COMPONENT DEFAULT VALUES

Component	Default Value	
Interior Air Film R-Value	0.61	
Drywall Layer R-Value	0.45	
Cavity Layer R-Values	Insulation: As Specified	Framing: R-1.25 per inch of wood
Standard Reference Design Insulation / Framing Fraction	Insulation: 93%	Framing: 7%
Proposed Design Default Insulation / Framing Fraction	Insulation: 91%	Framing: 9%
Exterior Air Film R-Value	0.61	

Section R402.6 of the IECC is added to read as follows:

R402.6 Moisture control. (Mandatory). The building design shall not create conditions of accelerated deterioration from moisture condensation. Above-grade frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation.

Exceptions:

1. In construction where moisture or its freezing will not damage the materials.
2. Frame walls, floors and ceilings in jurisdictions in Zone 4. (Crawl space floor vapor retarders are not exempted.)
3. Where other approved means to avoid condensation are provided.

Section R403.4 of the IECC is amended to read as follows:

R403.4. Service water heating. Service water heating systems and piping shall be installed in accordance with the applicable requirements of Sections R403.4.1 through R403.4.3.

Section R403.4.3 of the IECC is added to read as follows:

R403.4.3 Stub-in for solar water. All service water heating distribution systems for new work or renovations where interior finishes are to be removed shall have an identified stub-in connection point for future Solar Hot Water Systems in an accessible location with an access panel within 5 feet of the roof with an access panel and identified. Installation of solar hot water heating systems shall comply with Section M2301 of the International Residential Code.

Secs. 5-163 – 5-170. Reserved.